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Patent claims

1. A compound of the formula 1

in which

R1 is hydrogen, 1-4C-alkyl or hydroxy-1-4C-alkyl,

R2 is hydrogen, 1-4C-alkyl, hydroxy-1-4C-alkyl, halogen, 2-4C-alkenyl or 2-4C-alkynyl,

R3 is hydrogen, halogen, trifluoromethyl, 1-4C-alkyl, 2-4C-alkenyl, 2-4C-alkynyl, carboxyl, -CO-1-4C-alkoxy, hydroxy-1-4C-alkyl, 1-4C-alkoxy-1-4C-alkyl, fluoro-1-4C-alkoxy-1-4C-alkyl or the radical -CO-NR3aR3b,

one of the substitutents R4a and R4b is hydrogen and the other is hydroxyl, 1-4C-alkoxy, 1-4C-alkoxy, 1-4C-alkoxy, 1-4C-alkylcarbonyloxy or the radical R4', or in which R4a and R4b together are O (oxygen),

where R4' is a radical from which a hydroxyl group is formed under physiological conditions,

one of the substitutents R5a and R5b is hydrogen and the other is hydrogen, hydroxyl, 1-4C-alkoxy, 1-4C-alkoxy, 1-4C-alkoxy, 1-4C-alkylcarbonyloxy or the radical R5', or in which R5a and R5b together are O (oxygen),

where R5' is a radical from which a hydroxyl group is formed under physiological conditions,

where

one of the substituents R4a and R4b must have the meaning R4' and/or one of the substituents R5a and R5b must have the meaning R5',

R6 is hydrogen, halogen, 1-4C-alkyl, 1-4C-alkoxy, 1-4C-alkoxycarbonylamino, 1-4C-alkoxy-1-4C-alkoxycarbonylamino or trifluoromethyl.

R7 is hydrogen, halogen, 1-4C-alkyl or 1-4C-alkoxy and

X is O (oxygen) or NH,

where

R3a is hydrogen, 1-7C-alkyl, hydroxy-1-4C-alkyl or 1-4C-alkoxy-1-4C-alkyl and

R3b is hydrogen, 1-7C-alkyl, hydroxy-1-4C-alkyl or 1-4C-alkoxy-1-4C-alkyl,

or where

R3a and R3b together, including the nitrogen atom to which both are bonded, are a pyrrolidino, piperidino or morpholino radical,

or its salts.

- 2. A compound of the formula 1 as claimed in claim 1, in which
- R1 is 1-4C-alkyl,
- R2 is 1-4C-alkyl or hydroxy-1-4C-alkyl,
- R3 is hydrogen, halogen, carboxyl, -CO-1-4C-alkoxy, hydroxy-1-4C-alkyl, 1-4C-alkoxy-1-4C-alkyl, fluoro-1-4C-alkoxy-1-4C-alkyl or the radical -CO-NR3aR3b,
- one of the substituents R4a and R4b is hydrogen and the other is hydroxyl, 1-4C-alkoxy, 1-4C-alkoxy or the radical -OR', or in which R4a and R4b together are O (oxygen),
- one of the substituents R5a and R5b is hydrogen and the other is hydroxyl, 1-4C-alkoxy, 1-4C-alkoxy-1-4C-alkoxy or the radical -OR', or in which R5a and R5b together are O (oxygen),
- where one of the substituents R4a and R4b must have the meaning -OR' and/or one of the substituents R5a and R5b must have the meaning -OR',
- R6 is hydrogen, halogen, 1-4C-alkyl, 1-4C-alkoxy, 1-4C-alkoxycarbonylamino, 1-4C-alkoxy-1-4C-alkoxycarbonylamino or trifluoromethyl,
- R7 is hydrogen, halogen, 1-4C-alkyl or 1-4C-alkoxy and
- X is O (oxygen) or NH.

where .

R3a is hydrogen, 1-7C-alkyl, hydroxy-1-4C-alkyl or 1-4C-alkoxy-1-4C-alkyl and

R3b is hydrogen, 1-7C-alkyl, hydroxy-1-4C-alkyl or 1-4C-alkoxy-1-4C-alkyl,

or where.

R3a and R3b together, including the nitrogen atom to which both are bonded, are a pyrrolidino, piperidino or morpholino radical,

and where

R' is selected from the group consisting of

- -C(O)-NR8R9,
- -C(O)-alk-NR8R9,

- -C(O)-alk-C(O)-NR8R9,
- -P(O)(OH)2,
- -S(O)₂NR8R9,
- -C(O)-R8,
- -C(O)-C₆H₃R10R11,
- -C(O)-OR8,
- -C(O)-alk-C(O)-R8,
- -C(O)-alk-C(O)-OR8,
- -C(O)-C(O)-R8, ...
- -C(O)-C(O)-OR8 and
- -CH₂-OR8,

or its salts.

where

alk is 1-7C-alkylene,

R8 is hydrogen, 1-10C-alkyl or 1-4C-alkyl substituted by halogen, carboxyl, hydroxyl, sulfo (-SO₃H), sulfamoyl (-SO₂NH₂), carbamoyl (-CONH₂), 1-4C-alkoxy or 1-4C-alkoxycarbonyl,

R9 is hydrogen or 1-4C-alkyl,

R10 is hydrogen, halogen, nitro, 1-4C-alkyl, 1-4C-alkoxy, 1-4C-alkoxycarbonyl, 1-4C-alkoxycarbonylamino, 1-4C-alkoxy-1-4C-alkoxycarbonylamino or trifluoromethyl und
R11 is hydrogen, halogen, 1-4C-alkyl or 1-4C-alkoxy.

3. A compound as claimed in claim 1, having the formula 1

in which

R1 is 1-4C-alkyl,

R2 is 1-4C-alkyl,

R3 is hydrogen, chlorine, fluorine, hydroxymethyl, difluoromethoxymethyl or the radical -CO-NR3aR3b,

one of the substituents R4a and R4b is hydrogen and the other is hydroxyl, 1-4C-alkoxy, 1-4C-alkoxy or the radical -OR', or in which R4a and R4b together are O (oxygen),

one of the substituents R5a and R5b is hydrogen and the other is hydroxyl, 1-4C-alkoxy, 1-4C-alkoxy or the radical -OR', or in which R5a and R5b together are O (oxygen),

where one of the substituents R4a and R4b must have the meaning -OR' and/or one of the substituents R5a and R5b must have the meaning -OR',

R6 is hydrogen,

R7 is hydrogen and

X is O (oxygen) or NH,

where

R3a is hydrogen, 1-4C-alkyl, hydroxy-1-4C-alkyl or 1-4C-alkoxy-1-4C-alkyl and R3b is hydrogen, 1-4C-alkyl, hydroxy-1-4C-alkyl or 1-4C-alkoxy-1-4C-alkyl, and where

R' is selected from the group consisting of

-C(O)-NR8R9,

-C(O)-alk-NR8R9,

-C(O)-alk-C(O)-NR8R9,

-P(O)(OH)2,

-S(O)₂NR8R9,

-C(O)-R8,

-C(O)-C₆H₃R10R11,

-C(O)-OR8,

-C(O)-alk-C(O)-OR8,

-C(O)-C(O)-OR8 and

-CH2-OR8,

where

alk is 1-7C-alkylene,

R8 is hydrogen, 1-10C-alkyl or 1-4C-alkyl substituted by carboxyl or sulfo (-SO₃H),

R9 is hydrogen or 1-4C-alkyl,

R10 is hydrogen, halogen, nitro, 1-4C-alkyl, 1-4C-alkoxy, 1-4C-alkoxycarbonyl, 1-4C-alkoxycarbonylamino, 1-4C-alkoxy-1-4C-alkoxycarbonylamino or trifluoromethyl and R11 is hydrogen, halogen, 1-4C-alkyl or 1-4C-alkoxy, or its salts of the compounds.

- 4. A compound as claimed in claim 1, which has the formula 1* in claim 3, in which
- R1 is methyl,
- R2 is methyl,
- R3 is hydrogen, chlorine, fluorine, hydroxymethyl, difluoromethoxymethyl or the radical -CO-NR3aR3b,
- one of the substituents R4a and R4b is hydrogen and the other is 1-4C-alkoxy or 1-4C-alkoxy-1-4C-alkoxy,

one of the substituents R5a and R5b is hydrogen and the other is the radical -OR',

- R6 is hydrogen,
- R7 is hydrogen and
- X is O (oxygen) or NH,

where

R3a is hydrogen, methyl, ethyl, propyl, 2-hydroxyethyl or 2-methoxyethyl and

R3b is hydrogen, methyl or ethyl,

and where

R' is selected from the group consisting of

- -C(O)-NR8R9,
- -C(O)-alk-NR8R9,
- -C(O)-alk-C(O)-NR8R9,
- -P(O)(OH)₂,
- -S(O)₂NR8R9,
- -C(O)-R8,
- -C(O)-C₈H₃R10R11,
- -C(O)-OR8,
- -C(O)-alk-C(O)-OR8,
- -C(O)-C(O)-OR8 and
- -CH2-OR8,

where

- alk is 1-7C-alkylene,
- R8 is hydrogen, 1-10C-alkyl or 1-4C-alkyl substituted by carboxyl or sulfo (-SO₃H),
- R9 is hydrogen or 1-4C-alkyl,
- R10 is hydrogen, halogen, nitro, 1-4C-alkyl, 1-4C-alkoxy, 1-4C-alkoxycarbonyl or trifluoromethyl and

R11 is hydrogen or halogen, or the salts of the compound.

- 6. A compound as claimed in claim 1, which has the formula 1* in claim 3, in which

R1 is methyl,

R2 is methyl,

R3 is hydrogen, chlorine, fluorine, hydroxymethyl, difluoromethoxymethyl or the radical -CO-NR3aR3b,

one of the substituents R4a and R4b is hydrogen and the other is 1-4C-alkoxy or 1-4C-alkoxy-1-4C-alkoxy,

R5a is the radical -OR',

R5b is hydrogen,

R6 is hydrogen,

R7 is hydrogen and

X is O (oxygen) or NH,

where

R3a is hydrogen, methyl, ethyl, propyl, 2-hydroxyethyl or 2-methoxyethyl and

R3b is hydrogen, methyl or ethyl,

and where

R' is selected from the group consisting of

- -C(O)-NR8R9,
- -C(O)-alk-NR8R9,
- -C(O)-R8
- -C(O)-C₆H₃R10R11,
- -C(O)-OR8,

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-C(O)-alk-C(O)-OR8, and
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-C(O)-C(O)-OR8,

where

alk is 1-4C-alkylene,

R8. is hydrogen, 1-10C-alkyl or 1-4C-alkyl substituted by 1-4C-alkoxy,

R9 is hydrogen or 1-4C-alkyl,

R10 is hydrogen, halogen, nitro, 1-4C-alkyl, 1-4C-alkoxy, 1-4C-alkoxycarbonyl or trifluoromethyl and

R11 is hydrogen or halogen,

or its salts.

7. A compound as claimed in claim 1, which has the formula 1* in claim 3,

in which

R1 is methyl,

R2 is methyl,

R3 is hydrogen,

one of the substituents R4a and R4b is hydrogen and the other is 1-4C-alkoxy or 1-4C-alkoxy-1-4C-alkoxy,

R5a is the radical -OR'.

R5b is hydrogen,

R6 is hydrogen,

R7 is hydrogen and

X is O (oxygen) or NH,

where

R' is selected from the group consisting of

-C(O)-NR8R9,

-C(O)-alk-NR8R9,

-C(O)-R8

-C(O)-C₆H₃R10R11,

-C(O)-OR8,

-C(O)-alk-C(O)-OR8, and

-C(O)-C(O)-OR8,

where

alk is 1-4C-alkylene,

R8 is hydrogen, 1-10C-alkyl or 1-4C-alkyl substituted by 1-4C-alkoxy,

- R9 is hydrogen or 1-4C-alkyl,
- R10 is hydrogen, nitro, 1-4C-alkoxy or 1-4C-alkoxycarbonyl and
- R11 is hydrogen, or its salts.
- 8. A compound as claimed in claim 7, in which R' has the meaning $-C(O)-N(CH_3)_2$, $-C(O)-N(C_2H_5)_2$, $-C(O)-NHC_2H_5$, $-C(O)-CH_2N(CH_3)_2$, -C(O)-H, $-C(O)-CH_3$, $-C(O)-C_2H_5$, $-C(O)-CH_2OCH_3$, $-C(O)-C_6H_5$, $-C(O)-C_6H_4-4-NO_2$, $-C(O)-C_6H_4-3-NO_2$, $-C(O)-C_6H_4-4-OCH_3$, $-C(O)-CH_3$, $-C(O)-OCH_3$,
- 9. A medicament comprising a compound as claimed in claim 1 and/or a pharmacologically tolerable salt thereof together with customary pharmaceutical excipients and/or vehicles.
- 10. The use of compounds as claimed in claim 1 and their pharmacologically tolerable salts for the prevention and treatment of gastrointestinal diseases.